
WATERLINES

News affecting the management and use of Indiana's water resources

DIVISION OF WATER
INDIANA DEPARTMENT OF NATURAL RESOURCES
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RETROFITTING RESIDENTIAL STRUCTURES

What is retrofitting? Retrofitting is making changes to an existing building to protect it from flooding or other hazards such as high winds and earthquakes. Many houses existing today were built when little was known about where and how often floods and other hazardous events would occur or how buildings should be protected. Houses built today may benefit from improvements based on what we learn in the future. As a result, retrofitting has become a necessary and important tool in hazard mitigation.

The riverine and coastal floodplains of the United States are among the most highly desirable areas in the nation for habitation and construction. Unfortunately, many of these areas are very susceptible to flooding, which is the single most expensive and persistent natural disaster the country experiences. Flooding causes millions of dollars in property damage each year, despite concentrated efforts of government and the private sector to mitigate flood hazards.

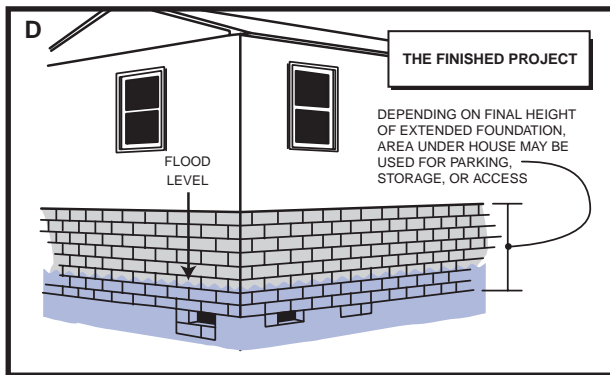
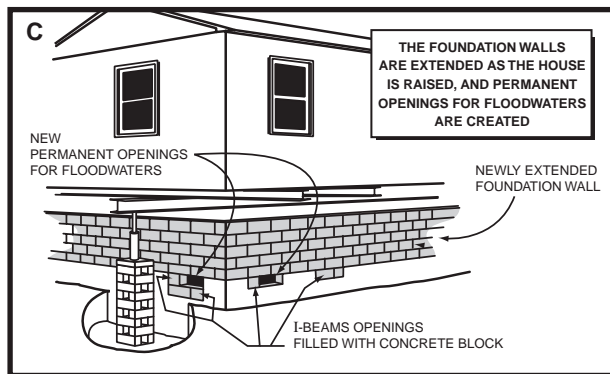
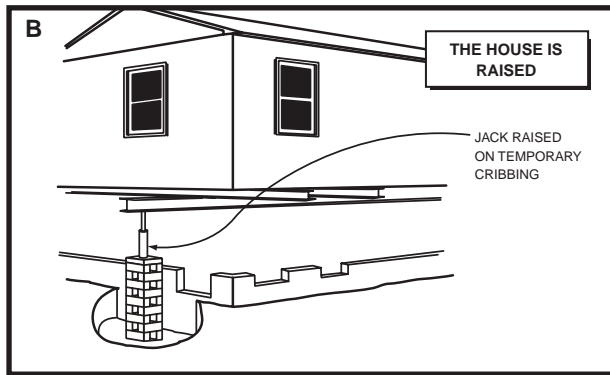
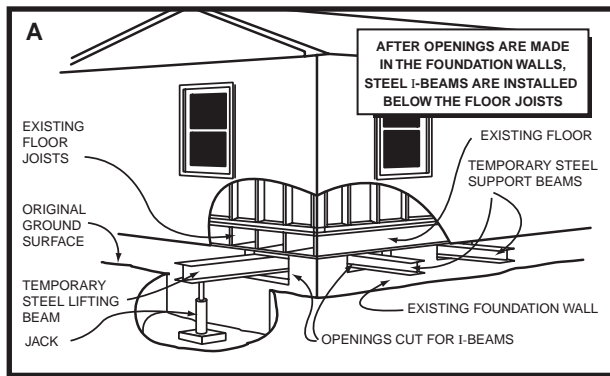
Owners who have experienced flooding know that complete recovery is often impossible. In addition to the time and money spent repairing or replacing damaged items, they must also deal with cleaning property, alleviating health risks and safety

hazards, losing time from work, finding alternative housing, and the emotional toll of the experience. Responding to flood events also depletes resources at every level of government. Human resources and capital must be diverted to providing emergency services, rebuilding public facilities, financing individual assistance for uninsured victims, and to other efforts. *In the Great Midwest Flood of 1993, for example, FEMA estimated damage costs exceeded \$10 billion.*

Most structures damaged by flood were built before the community adopted National Flood Insurance Program (NFIP)-compliant floodplain management regulations. However, owners have the option of taking steps to reduce the likelihood of serious future flood damage. Retrofitting individual flood-prone structures is a proven technology that has been in use for many years.

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One of the most common retrofitting methods is elevating a house to a required or desired elevation. When a house is properly elevated, the living area will be above all but the most severe floods (such as the 500-year flood). Several elevation techniques are available. In general, they involve (1) lifting the house and building a new, or extending the existing, foundation below

it or (2) leaving the house in place and either building an elevated floor within the house or adding a new upper story.

During the elevation process, most frame, masonry veneer, and masonry houses are separated from their foundations, raised on hydraulic jacks, and held by temporary supports while a new or extended foundation is constructed below. The living area is raised and only the foundation remains exposed to flooding. This technique works well for houses originally built on basement, crawlspace, and open foundations. When houses are lifted with this technique, the new or extended foundation can consist of either continuous walls or separate piers, posts, columns, or pilings. Masonry houses are more difficult to lift, primarily because of their design, construction, and weight, but lifting these homes is possible. In fact, numerous contractors throughout the United States regularly perform this work.

A variation of this technique is used for frame, masonry veneer, and masonry houses on slab-on-grade foundations. In these houses, the slab forms both the floor of the house and either all or a major part of the foundation. Elevating these houses is easier if the house is left attached to the slab and both are lifted together. After the house and slab are lifted, a new foundation is constructed below the slab.

For masonry houses on slab-on-grade foundations, some homeowners find it easier to use one of two alternative elevation techniques, in which the house is left on its original foundation. One technique is to remove the roof, extend the walls of the house upward, replace the roof, and then build a new elevated living area inside. The second is to abandon the existing lower enclosed area (the level with the slab floor) and move the living space to an existing or newly constructed upper floor. The abandoned lower enclosed area is then used only for parking, storage, and access to the house.

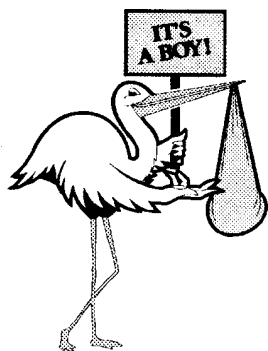
In both of these techniques, portions of the original walls will be below the new elevated

living area. This approach is appropriate for masonry construction, which is naturally flood resistant, but not for frame construction, which could easily be damaged by flood waters.

Given the potential cost of recovering from a serious flood event and meeting the NFIP's criteria for restoring substantially damaged property, the owner of a flood-prone home has an incentive to undertake retrofitting measures to limit future flood damages. The Federal Emergency Management Agency (FEMA) and other contributing agencies and organizations have developed a manual to provide engineering and related economic guidance to professional designers and local officials about what constitutes technically feasible and cost-effective techniques. FEMA publication FEMA 259/January 1995 entitled "*Engineering Principles and Practices for Retrofitting Flood Prone Residential Buildings*" and FEMA publication FEMA 312/June 1998 entitled "*Homeowners Guide to Retrofitting-Six Ways to Protect Your House from Flooding*" are excellent resources when considering retrofitting. Copies of these publications are available from the Division of Water or they can be ordered directly from FEMA.

Keep in mind that any retrofitting project you undertake must meet the legal requirements of your community, including the floodplain management ordinances your community adopted to participate in the NFIP.

*Adapted from Homeowners Guide to Retrofitting, FEMA Publication 312/June 1998 ≈



IT'S A BOY

Beth Tallon, the Division's Water Planner for northern Indiana, is a new mother. Eion Thomas was born on July 26, 2000. This healthy guy weighed in at 7 lbs. 1 oz. and he was 19 1/4" long.

Mother and son are doing well. Congratulations Beth and Steve!

WHAT EXACTLY IS A 100 YEAR FLOOD?

The phrase "100-year flood" still seems to cause confusion among the public, lenders, and insurers. Many continue to believe it is a description of a flood that occurs only once every 100 years. In fact, "100-year flood" is an abbreviated way of describing the magnitude of rainfall and subsequent flood event that has a 1-percent chance of occurring.

Floods are classified according to their frequency and depth. For instance, there are 10-year, 25-year, 50-year, 100-year, and 500-year floods. A 100-year flood occurs less frequently than a 10-year flood, but because it has larger volume and greater depth of water, is far more destructive and damaging, and is a more serious threat to human safety. The National Flood Insurance Program (NFIP) adopted as a national standard a "100-year floodplain" to describe Special Flood Hazard Areas (SFHAs) that are depicted on the Flood Insurance Rate Maps (FIRMs) as Zone A. Due to the confusion it created, use of the term "100-year floodplain" has been replaced with the newer designation of "base flood". Base Flood Elevations (BFEs) are listed on FIRMs and are used on Elevation Certificates to indicate the expected depth of water should a flood occur. In Indiana, new buildings constructed in SFHAs are required to have their lowest floors at or above the Flood Protection Grade (FPG) which is two feet above the BFE listed for that location on the current FIRM. The chart on the following page shows the statistical chances of flooding a building located in one of these higher risk areas over different periods of time.

Buildings located in 100-year flood areas are required to have flood insurance as a condition of receiving a federally backed mortgage loan or home equity loan. Given that many mortgages have a repayment period of 30 years, buildings in areas subject to a 100-year flood have a 26 percent chance of experiencing a flood during the life of the loan. However, during that same period, there is only a 4 percent chance of a fire.

So, the next time you hear someone who lives in a 100-year floodplain say something like “I don’t have to worry about another flood for 97 years—since the last 100-year flood was three years ago”, refer them to this information to explain the real meaning of a 100-year flood.

Chances of Being Flooded

Period of Time	10-yr flood	25-yr flood	50-yr flood	100-yr flood
1 year	10%	4%	2%	1%
10 years	65%	34%	18%	10%
20 years	88%	56%	33%	18%
30 years	96%	71%	45%	26%
50 years	99%	87%	64%	39%

*excerpted from NFIP Watermark, Fall/Winter 1998

FLOOD MITIGATION ASSISTANCE (FMA)



The Federal Emergency Management Agency’s (FEMA’s) Flood Mitigation Assistance (FMA) provides funding to assist States and communities in implementing measures to reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures insurable under the National Flood Insurance Program (NFIP).

FMA was created as part of the National Flood Insurance Reform Act of 1994 with the goal of reducing or eliminating claims under the NFIP. FMA is a pre-disaster grant program.

Getting Started Planning is the foundation of FMA. FEMA encourages communities to identify ways to reduce their risk of flood damage by preparing Flood Mitigation Plans.

Communities that have Flood Mitigation Plans can request approval of their plans from their FMA

State Point of Contact (POC) and FEMA. Approved plans make a community eligible to apply for FMA project grants. Plans must assess flood risk and identify actions to reduce that risk.

Two Types of Grants to Communities There are two types of grants to communities:

- Planning Grants
Grants to States and communities to develop or update Flood Mitigation Plans.
- Project Grants
Grants to States and communities to implement measures to reduce flood losses.

Examples of Eligible Projects Projects that reduce the risk of flood damage to structures insurable under the NFIP are eligible. Such activities include:

- Elevation of insured structures.
- Acquisition of insured structures and real property
- Relocation or demolition of insured structures.
- Dry floodproofing of insured structures.

Applicant Eligibility Any State agency, participating NFIP community, or qualified local organization is eligible to participate in FMA. Communities that are suspended or on probation from the NFIP are not eligible.

Project Grant Eligibility Criteria Projects must, at a minimum be:

- Cost effective.
- Cost beneficial to the National Flood Insurance Fund.
- Technically feasible.
- Physically located in a participating NFIP community or must reduce future flood damages in an NFIP community.

The project must also conform to the minimum standards of the NFIP Floodplain Management Regulations, the applicant’s Flood Mitigation Plan, and all applicable laws and regulations, such as Federal and State environmental standards or local

building codes.

How FMA Works FMA funds are distributed to States, which in turn provide funds to communities. The State serves as the grantee and program administrator for the FMA. The State :

- Sets mitigation priorities.
- Provides technical assistance to communities applying for FMA funds.
- Evaluates grant applications based on minimum eligibility criteria and State priorities.
- Awards planning grants.
- Works with FEMA to approve projects and awards funds to communities.
- Ensures that all community applicants are aware of their grant management responsibilities.

Cost-Share and Funding Limits FEMA may contribute up to 75 percent of the total eligible costs. At least 25 percent of the total eligible costs must be provided by a nonfederal source. Of this 25 percent, no more than half can be provided as in-kind contributions from third parties. There are limits on the frequency of grants and the amount of funding that can be allocated to a State or community in any 5-year period.

For information on how to apply for an FMA grant, contact your State POC, Jan Crider of the Indiana State Emergency Management Agency. She can be reached by phone at 317-232-3833 or e-mail at jcrider@sema.state.in.us ☺

INAFSM WEB PAGE

The Indiana Association of Floodplain and Stormwater Management (INAFSM) now has a web page. The site provides basic information on the organization including membership information and upcoming events. Check it out at www.inafsm.org. ☺



CONFERENCE CORNER

2000 INAFSM CONFERENCE

The Fourth Annual Indiana Association for Floodplain and Stormwater Management (INAFSM) Annual Meeting & Conference will be held on September 13-15, 2000 at the Four Winds Resort and Marina on beautiful Lake Monroe near Bloomington, Indiana. This three-day conference will feature several informative speakers with topics relating to stormwater and floodplain management. In addition, the Association of State Floodplain Managers (ASFPM) Certified Floodplain Manager (CFM) Exam will be offered on the final day of the conference. For further information regarding registration and fees for the exam, contact the Floodplain Management Section at 1-877-928-3755.

INAFSM has reserved a block of rooms until August 14, 2000. Call 1-800-538-1187 and ask for INAFSM to receive discounted room rate.

Registration for the conference will be \$110 for INAFSM members and \$130 for non-members. For more information regarding this conference, call Rod Renkenberger at 219-449-7226. ☺

CONGRATULATIONS

The Indiana Department of Natural Resources proctored the first Association of State Floodplain Managers (ASFPM) Certified Floodplain Manager (CFM) Exam on March 31, 2000. Congratulations to the following people as the first Certified Floodplain Managers in Indiana: Nabil Ghalayini, Schneider Corporation; Tiffany Strait, Columbus Planning Department; and Siavash Beik, Christopher B. Burke Engineering. In Indiana, the next exam will be offered at the INAFSM conference on September 15. For further information, contact the Floodplain Management Section at 1-877-928-3755. ☺

COOPERATING TECHNICAL COMMUNITIES (CTC)

The Federal Emergency Management Agency (FEMA) flood mapping program has specific mandates within the Housing and Urban Development Acts of 1968 and 1969; the Flood Disaster Protection Act of 1973; and the National Flood Insurance Reform act of 1994. These acts authorize FEMA to identify, publish, and update information with respect to all floodplain areas in the nation. FEMA complies with this mandate by publishing and updating flood maps for more than 18,000 communities.

Because flood conditions change over time due to natural and man-made changes in watersheds and floodplains, FEMA has an ongoing program to update the flood maps for floodprone communities. However, flood map update needs are increasing and Federal funding is limited, resulting in a significant portion of the 100,000-panel flood map inventory becoming outdated. Therefore, in 1997 FEMA designed a plan to modernize the inventory. Over time, the objective is to eliminate the existing backlog of outdated maps and to convert all the maps to a digital format.

One of the key objectives of the modernization plan is to increase local involvement in, and ownership of, the flood mapping process. Therefore, the Cooperating Technical Community (CTC) concept was developed. As technologies have increased dramatically, many States, regional agencies, and local communities have become increasingly sophisticated and have invested significant resources in flood hazard identification.

Under the CTC initiative, communities or organizations associated with the National Flood Insurance Program (NFIP) can enter into a formal agreement with FEMA and State government for a shared commitment in the funding and implementation of various activities associated with floodplain mapping and flood risk assessment. The main requirement for general eligibility as a CTC partner is that the partner be a community

participating in the NFIP, and be in good standing in the program as determined by the FEMA Regional Office, or be a State or regional agency that serves communities that participate in the NFIP.

The CTC agreement is designed to delegate many activities to local government, and is established by mutual adoption of a Memorandum of Agreement (MOA). The MOA includes a reference to specific mapping activity agreements by appendix. These agreements are based on a menu of templates that FEMA has assembled for this purpose. Seven mapping activity agreement templates have been developed for use in the pilot years of the CTC initiative through September of year 2000. These templates are listed below:

- Redelineation of Floodplain Boundaries using Updated Topographic Data
- Refinement of Approximate Zone A Boundaries
- Hydrologic and Hydraulic Analyses and Floodplain Mapping
- Digital FIRM Preparation
- Digital FIRM Maintenance
- Digital Base Map Sharing
- Digital Topographic Data Development

Each template details a set of objectives or scope, performance period, milestone schedules, funding/cost sharing arrangements, standards, products, technical assistance, subcontractor identification and Quality Assurance procedures. The above mapping activity templates are available on computer disk. For a copy of this disk, or for more information on the CTC initiative, please call Ken Hinterlong, Regional CTC Coordinator, at (312) 408-5529.

The CTC concept is one of many aspects of FEMA's map modernization program. Visit the FEMA website to obtain up-to-date information on all aspects of map modernization. The website may be addressed at <http://www.fema.gov/mit/tsd/>
**Information provided by FEMA* ∞

PRECIPITATION REPORT FOR JANUARY THROUGH JUNE 2000

The drought, which began last summer, continued into the new year. There was a brief respite from the drought at the beginning of January when rain events and snowfall events occurred. Areas near Lake Michigan received more than 2.5 inches – mostly due to several lake effect snow events which occurred over northwest Indiana. South Bend received over 37 inches of snow in January. Also, heavy rain moved over south central Indiana causing significant flash flooding in most Indiana counties bordering the Ohio River.

Near normal precipitation was experienced in most of the state during February; however, in March there was a return to the warm and dry conditions that prevailed in much of Indiana for nearly a year.

Although rainfall was below normal during March in central Indiana, snowfall was above normal. Indianapolis received the most snow for March since 1996. The 8.1 inches of snow that fell at Indianapolis was the 6th greatest single March snow event ever for Indianapolis. On the opposite extreme, only a trace of snow fell at South Bend



during the entire month of March.

April 2000 was cooler and dryer than normal across much of northern Indiana. Again, below normal precipitation continued the drought conditions in this area.

In contrast, heavy rain on April 7 caused the most significant flooding along the East Fork White River in Jackson County since February 1999. Little rain fell in Indiana after the 20th; and, at the close of April, rivers and streams in Indiana were at low levels. Soils in Indiana were generally dry.

Much of Indiana was warmer and wetter than normal in May. In general, drought conditions eased greatly over most of central, northern, and south central Indiana and did not return in the remainder of southern Indiana.

Almost the entire state had above normal rainfall during the month of June. A few areas noted record monthly rainfall. This was the third consecutive month where above normal rainfall occurred in northern and much of central Indiana. For the most part, the drought in Indiana ended at the close of June. ☁

		KEY:	<div>ACTUAL (INCHES)</div> <div>NORMAL (INCHES)</div>				
Airport	January	February	March	April	May	June	Totals
Locations	2000	2000	2000	2000	2000	2000	
CHICAGO	1.25	1.97	1.18	5.15	3.78	2.92	20.22
IL	1.52	1.35	2.68	3.63	3.32	3.78	16.28
SOUTH BEND	2.57	1.63	1.81	3.69	4.57	3.94	18.21
IN	2.23	1.90	3.10	3.82	3.22	4.11	18.38
FORT WAYNE	1.25	1.57	2.01	2.09	3.60	6.39	16.91
IN	1.87	1.91	2.90	3.37	3.43	3.59	17.07
INDIANAPOLIS	2.07	2.86	1.64	3.80	1.92	4.93	25.27
IN	2.32	2.45	3.79	3.69	4.00	3.49	19.74
EVANSVILLE	4.36	7.26	3.21	2.35	2.46	5.63	24.97
IN	2.66	3.12	4.71	4.02	4.75	3.49	22.75
LOUISVILLE	6.22	5.80	3.56	2.95	2.92	3.52	16.25
KY	2.85	3.30	4.66	4.23	4.62	3.46	23.12
CINCINNATI	4.45	5.71	3.34	4.27	3.47	3.06	24.30
OH	2.59	2.69	4.23	3.75	4.27	3.84	21.37

INDIANA DEPARTMENT OF NATURAL RESOURCES
DIVISION OF WATER
402 WEST WASHINGTON STREET, ROOM W264
INDIANAPOLIS, INDIANA 46204-2743

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Editor - Anita Nance

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Division of Water
Indiana Department of Natural Resources
402 West Washington Street, Room W264
Indianapolis, Indiana 46204-2743
Phone: (317)232-4160
Toll free 1-877-WATER55